Appl. No. 10/734,366   <u>PATENT</u>
Amdt. dated August 31, 2007
Reply to Office Action of March 13, 2007

<u>REMARKS/ARGUMENTS</u>

<u>The Invention</u>

The invention relates to relational databases, database use, graphical presentation of data, genomics, and gene discovery.

<u>Status of the Claims</u>

Claims 1-16, 18-24 and 26-28 are pending in this application.

Claims 17 and 25 are cancelled.

Claims 1-8, 16 and 24 are rejected under 35 U.S.C. §102(e) as allegedly anticipated by Imachi *et al.* (U.S. Patent 7,047,255).

Claims 9-15, 18-23, and 24, and 26-28 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Imachi *et al.* (*supra*) in view of Karchi *et al.* (U.S. Patent application publication 2004/0121360).

<u>Response to Rejections Under 35 U.S.C §102 (e)</u>

Claims 1-8, 16 and 24 are rejected under 35 U.S.C. §102(e) as allegedly anticipated by Imachi *et al.* (U.S. Patent 7,047,255 hereinafter *Imachi*).

The Examiner alleges that *Imachi* anticipates claims 1-8, 16 and 24.

The Examiner states: "As per independent claims 1 and 5, IMACHI teaches: A method of displaying data from a relational database comprising the steps of

  a. Providing at least two libraries of data from different sources {See Imachi, col. 4, lines 11-18, wherein this reads over "there are provided two document groups"};

  b. Identifying clusters of related data by comparing the data of each library {See Imachi, col. 4, lines 29-35, wherein this reads over "documents or words having high relevance degree, in terms of the axis direction subject to clustering, are adjacently plotted in clusters"};

  c. Providing a multi-dimensional display comprising a circular figure {See Imachi, Figures 3-4, 8-10, and 12-15; and col. 4, lines 29-35, wherein this reads over

"elements of either or both of the vertical and horizontal axes are subjected to clustering for rearrangement and the results are displayed in the two-dimensional coordinate system"}having loci distributed about the periphery thereof wherein each locus is identified with one data library; and

d. Plotting a symbol for each cluster within the multidimensional figure based on a set of coordinates within said multi-dimensional display, wherein said coordinates are a function of a specific comparative analysis applied to said data libraries which contributed data to said cluster {See Imachi, col. 4, lines 9-21 wherein this reads over "[b]y displaying the relationship between the documents in the two-dimensional coordinate system, it is possible to grasp at a glance the whole characteristics of the document groups such as the relationship between document groups as a whole or between individual documents'}."

"As per independent claims 2 and 6, IMACHI teaches:

The method of claim 1, wherein the comparative analysis includes the number of said data libraries which contribute data to said cluster {See IMACHI, col. 6, lines 1-8, wherein this reads over "wherein T is the total number of documents"}."

"As per independent claims 3 and 7, IMACHI teaches: The method of claim 1, wherein the comparative analysis includes the amount of data from each library which contributes to said cluster {See IMACHI, col. 6, lines 1-22 wherein this reads over "df(t) is the number of documents which contain the word (t)" and" }."

"As per independent claims 4 and 8, IMACHI teaches: The method of claim 1, wherein the comparative analysis includes the amount of data from each library which contributes to said cluster {See col. 8, lines 35-38, wherein this reads over "the relevance degree calculation unit calculates the relevance degree between the words and documents"}"

"As per independent claim 16 IMACHI teaches: A computer program for conducting a search for and plotting of alphanumeric data, the computer program being stored on a computer readable medium or transmitted by a propagated signal and comprising:

a. A receiving code segment that causes the computer to receive input including one or more search criteria{See IMACHI col. 2, lines 59-60, wherein

this reads over "" a step for receiving a search request on a document database"}for at least one searchable alphanumeric character in a data library containing alphanumeric characters {See IMACHI Figure 6; and col. 8, lines 11-16, wherein this reads over "a search request input unit for inputting search keywords" }, wherein the at least one searchable alphanumeric characters correspond to at least one contig {See IMACHI col. 2, lines 59-60, wherein this reads over "a step for receiving a search request on a document database"; and col. 8, lines 26-28 wherein this reads over "as a result a document group is obtained" };

b.　　An assigning code segment that causes the computer to assign a value to each alphanumeric character{See IMACHI col. 2, lines 59-60, wherein this reads over "[w]hen each line of the table in FIG. 2 is regarded as a vector, each element of Document Unit A can be expressed as a weighting vector for each element of Document B"}corresponding to at least one contig; and

c.　　A plotting code segment that causes the computer to plot the input on a visual display comprising a circular figure, said plot relating to said value assigned to the alphanumeric character {See IMACHI col. 8, lines 38-42, wherein this reads over"[t]he client visualizes the relevance between the word group and the document group in the two-dimesional coordinate system on the display unit}corresponding to at least one contig."

The Examiner disagrees with the Applicants' previous assertion that: *Imachi* is *completely silent* with respect to disclosure of "a *multidimensional display comprising a figure* having loci distributed about the periphery thereof" and "plotting a symbol for each cluster within the *multidimensional* figure based on a set of coordinates within said *multi-dimensional display*", and therefore, *Imachi* fails to disclose each and every element of the claims.

The Examiner cites Imachi at column 4, lines 11-21 which discloses:

"When there are provided two document groups (document groups A and B), document groups A and B are plotted on one axis and the other axis, respectively, and the relevance degree between a document i of document group A and a document j of the document group B is indicated at a

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coordinate (i, j) with an indication type according to the relevance degree. By displaying the relationship between the documents in the two-dimensional coordinate system, it is possible to grasp at a glance the characteristics of the document groups such as the relationship between document groups as a whole or between individual documents."

The Examiner further directs Applicants to Figures 3-4, 8-10, and 12-15 of Imachi which disclose display examples of clustering in a two-dimensional coordinate system. The Examiner then states that: "It is unclear to the Examiner, how the resulting cluster would not be considered 'a multidimensional figure based on a set of coordinates.'" The Examiner therefore alleges that: "One of ordinary skill in the art would clearly understand that plotting of elements on a two-dimensional display to create clusters would clearly read on the applicants invention."

Finally, the Examiner states that: "Applicants arguments against the references individually (i.e. See Amendment page 9, "Imachi is also completely silent with respect to disclosure of 'contigs' and 'EST data'), one cannot show nonobviousness [sic] by attacking references individually where rejections are based on combinations of references....

Applicants respectfully traverse the rejection.

According to MPEP 2131, to anticipate a claim, the reference *must teach every element of the claim.* Indeed, as cited in MPEP 2131: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference *Verdegall Bros. v. Union Oil Co. of California* 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the... claim" *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1990).

It is unclear to Applicants why the Examiner continues to allege that a *two-*dimensional display is a *multi-*dimensional display. Furthermore, Applicants' claims clearly recite that the multi-dimensional display is a *circular* figure.

Imachi is, in fact, *completely silent* with respect to disclosure of "a *multi-dimensional display comprising a circular figure* having loci distributed about the periphery thereof" and "plotting a symbol for each cluster within the *multi-dimensional* figure based on a

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set of coordinates within said *multi-dimensional display*", as claimed by the Applicants. Therefore, *Imachi fails* to disclose each and every element of the claims. With respect to the Examiner's rejection of claims 16 and 24, *Imachi* is also, in fact, completely silent with respect to the recitation of "contigs" and "EST data".

Clearly, *Imachi* fails to disclose each and every element of the claims, either expressly or inherently, and therefore the reference is not a proper basis for rejection under 35 U.S.C. §102. Thus, the rejection of claims 1-8, 16 and 24 under 35 U.S.C. §102(e) is improper. Therefore, Applicants again respectfully request that the rejection be withdrawn.

Response to Rejections Under 35 U.S.C §103 (a)

Claims 9-15, 18-23, and 25-28 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over *Imachi* in view of Karchi *et al.* (U.S. Patent application publication 2004/0121360 hereinafter *Karchi*).

The Examiner alleges that *Imachi* teaches the limitations of claims 1-8, 16-17, and 25, for the reasons stated above. Interestingly, the Examiner admits that "*Imachi* differs from the claimed invention in that *Imachi* fails to disclose ESTs, EST libraries, and contigs (claims 9-15, 17-23, and 26-28)."

Specifically, the Examiner alleges that:

"As per Independent claim 9, IMAICHI, in combination with KARCHI, discloses: A method for displaying data from a relational database of EST libraries comprising the steps of

a. providing a plurality of EST libraries {See KARCH I, Para. 0160, wherein this reads over "458 available EST libraries"};

b. identifying contigs by comparing the ESTs of said plurality of EST libraries {See KARCHI, Para. 0148, wherein this reads over "data from EST databases containing approximately 125,000 ESTs from 48 libraries" and "Transcribed nucleic add sequences were computation ally clustered nad assembled to create contigs"};

c. providing a multi-dimensional display comprising a circular figure {See IMAICHI, Figures 3-4, 8-10, and 12-15; and col. I, lines 29-35, wherein this reads over "the elements of either

or both of the vertical and horizontal axes are subjected to clustering for rearrangement and the results are displayed in the two-dimensional coordinate system"} having loci distributed about the periphery thereof, wherein each locus is associated with one of said libraries {See IMAICHI, col. 'I, lines 29-35, wherein this reads over "documents or words having high relevance degree, In terms of the axis direction subject to clustering, are adjacently plotted in clusters"};

d.   plotting a symbol for each contig within the multidimensional display based on a set of coordinates within said multi-dimensional display, wherein each symbol is disposed within the figure at a point within an area between the loci associated with the libraries which contributed to said contig {see IMAICHI, col. 9-21, wherein this reads over "[b]y displaying the relationship between the documents in the two-dimensional coordinate system, it is possible to grasp at a glance the characteristics of the document groups such as the relationship between document groups as a whole or between individual documents"}."

Therefore, the Examiner alleges that: "it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above invention suggested by IMAICHI by combining it with the invention disclosed by KARCHI. The results of this combination would lead to a method of identifying contigs by comparing ESTs and plotting contig data on a muiti-dimensional display. One of ordinary skill in the art would have been motivated to do this modification so that an overall visual representation of data (specifically, ESTs and contigs) may be presented by plotting data which have been gathered and clustered by common attributes.

The Examiner further rejects the claims alleging that:

"As per dependent claims 10, 18, and 26, IMAICHI, in combination with KARCHI, discloses:

The method of claim 9, wherein said coordinates are determined as a function {See IMAICHI, col. 5, lines 41-45, wherein this reads over "these can be elements to be plotted on the vertical axis or horizontal axis of the two-dimensional coordinate system"} of the number of said libraries {See IMAICHI, col. 9-21, wherein this reads over "[b]y displaying the relationship between the documents in the two-dimensional coordinate system, it is possible to grasp at a glance the characteristics of the document groups such as the relationship between document groups as a whole or between

individual documents"} which contributed ESTs to said contig {see KARCHI, Para. 0148, wherein this reads over "data from EST databases containing approximately 125,000 ESTs from 48 libraries" and "Transcribed nucleic acid sequences were computationally clustered nad assembled to create contigs"}."

"As per dependent claim 11, 19, and 27, IMAICHI, in combination with KARCHI, discloses:

The method of claim 9, wherein said coordinates are determined as a function {See IMAICHI, col. 5, lines 41-45, wherein this reads over "these can be elements to be plotted on the vertical axis or horizontal axis of the two-dimensional coordinate system"} of the proportion {See IMAICHI, col. 6, lines 1-22, wherein this reads over "df(t) is the number of documents which contain the word (t)" and "} of ESTs in said contig contributed by each of said libraries {See KARCHI, Para. 0148, wherein this reads over "data from EST databases containing approximately 125,000 ESTs from 48 libraries" and "Transcribed nucleic add sequences were computationally clustered nad assembled to create contlgs"}."

"As per dependent claim 12, 20 and 28, IMAICHI, in combination with KARCHI, discloses:

The method of claim 9, wherein said coordinates are determined as a function {See IMAICHI, col. 5, lines 41-45, wherein this reads over "these can be elements to be plotted on the vertical axis or horizontal axis of the two-dimensional coordinate system"} of the number {See IMACHI, col. 6, lines 1-22, wherein this reads over "df(t) is the number of documents which contain the word (t)" and "} of ESTs in said contig from a given library relative to the total number of ESTs in said library {See KARCHI, Para. 0148, wherein this reads over "data from EST databases containing approximately 125,000 ESTs from 48 libraries" and "Transcribed nucleic acid sequences were computationally clustered and assembled to create contigs"}."

"As per dependent claim 13, IMAICHI, in combination with KARCH I, discloses:

The method of claim 9, and further comprising selecting a subset of said libraries {See KARCHI, Para. 0160, wherein this reads over "[o]ut of 458 available EST libraries, 48 containing >50 ESTs were selected"} distributed about the periphery of said multi-dimensional display and repeating steps (b) through (d)."

"As per dependent claim 14, IMAICHI, in combination with KARCH I, discloses:

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The method of claim 9, and further comprising rearranging said libraries {See IMACHI, Figures 3-4, 8-10, and 12-15; and col. 4, lines 29-35, wherein this reads over "the elements of either or both of the vertical and horizontal axes are subjected to clustering for rearrangement and the results are displayed In the two-dimensional coordinate system"} distributed about the periphery of said multi-dimensional display and repeating steps (b) through (d)."

"As per dependent claim 15, IMAICHI, in combination with KARCH I, discloses:

The method of claim 9, wherein said libraries are selected from one or more libraries based on species, cultivar, tissue, developmental stage See KARCHI, Para. 0038, wherein this reads over "the type of tissues from which the transcribed nucleic add sequences were derived" and "the number of clusters of said transcribed nucleic acid sequences generated by the library from which said contigs are derived"}."

"As per dependent claims 21-23, IMAICHI, in combination with KARCHI, discloses:

The computer program of claim 18 (also 19 and 20) wherein the plotting code segment plots {See IMACHI, col. 8, lines 38-42, wherein this reads over "[t]he client visualizes the relevance between the word group and the document group in the two-dimensional coordinate system on the display unit"} a plurality of contigs on a visual display thus enabling a computer user to see relationships between and among said plotted contigs {See KARCHI, Figures 3 and 4}."

"As per Independent claim 24, IMAICHI teaches:

A system for plotting and manipulating data points, the system comprising:

a. A computer program stored on computer readable medium, said program {See IMACHI, col. 2, lines 59-60, wherein this reads over "a step for receiving a search request on a document database"; col. 8, lines 38-42, wherein this reads over "[t]he client visualizes the relevance between the word group and the document group in the two- dimensional coordinate system on the display unit"} and plotting contigs assembled from libraries containing EST data represented in alphanumeric form {See KARCHI, Para. 0003, wherein this reads over "a method and system for efficiently detecting a group of a relatively small number of documents having the same or similar keyword (hereinafter referred to as an outlier cluster"; and Para. 0148, wherein this reads over "data from EST databases containing approximately 125,000 ESTs from 48 libraries" and "Transcribed nucleic acid sequences were computationally clustered and assembled to create contigs"};

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b. Computer means capable of operating said computer program;

c. Graphical display means, capable of displaying said data as a multi-dimensional display comprising a circular figure using a plurality of colors."

The Examiner states: "It is inherent that a system would comprise a computer means capable of operating a computer program. Without said operational capabilities, the system would not be able to search, retrieve, and plot the requested data. Additionally, it is inherent that the graphical display means use a plurality of colors. Without the use of a plurality of colors, displaying plotted data would not be capable since the display would be presented in only one color."

Thus, The Examiner characterizes the combination of *Imachi* with *Karchi* as teaching a method of identifying contigs by comparing ESTs and plotting contig data on a multi-dimensional display.

Applicants respectfully traverse the rejection.

In response to previous arguments by Applicants, the Examiner responds that the he recognizes that obviousness can only be established by combining or modifying the reference teachings of the prior art to produce the claimed invention where there is some teaching suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. The Examiner then directs Applicants to the motivation provided in the Office action of June 13, 2006. Namely that: "one of ordinary skill in the art would have been motivated to do this modification so that an overall visual representation of data may be presented by plotting data which have been gathered and clustered by common attributes."

The Examiner also rejects the Applicants previous argument regarding non-analogous art. Regarding non-analogous art, the Examiner is correct that this argument was not appropriate. However, despite this, it is still the case that the Examiner has failed to set forth a proper *prima facie* case of obviousness.

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A Proper Prima Facie Case of Obviousness Has Not Been Set Forth

To construct a *prima facie* case of obviousness, the Examiner must meet three
criteria. First, there must be some suggestion or motivation whether in the references themselves
or in the knowledge generally available to those of skill in the art, to modify the reference or
combine the reference teachings. Second, there must be a reasonable expectation of success.
Third the prior art reference(s) must teach or suggest all of the claim limitations. *See* MPEP
§2142.

(1) There is no suggestion or motivation to modify the reference teachings

Imachi teaches a method for analyzing documents by extracting two document
units from a document database and relevance degrees between individual elements of a group of
the document units are calculated. The results are displayed on a *two-dimensional* coordinate
plane depending on the relevance degree (*see e.g.*, Abstract).

Karchi teaches methods, platforms and kits for identifying and isolating ***non-
coding*** genomic sequences which regulate gene expression in an organism. Embodiments of the
present invention relate to methods of isolating and utilizing ***non-transcribed*** genomic sequences
for generating genotypic and possibly phenotypic variation in the organism and for identifying
and characterizing ***regulatory sequences*** participating in biological pathways. *See*, Karchi para
[0001]

A person of skill in the art would not be motivated to combine the references
since the references since *Imachi* teaches that the results are displayed on a *two-dimensional*
coordinate plane, and *Karchi* teaches methods of isolating and utilizing ***non-transcribed***
genomic sequences for generating genotypic and possibly phenotypic variation in the organism.
Therefore, the combination of references does not provide a reasonable expectation of success.

Karchi teaches that: "isolation and characterization of such non-coding regions
can provide insight into the regulatory mechanisms underlying phenotypic variation" *see* para.
[0071]. And that: "... according to one aspect of the present invention there is provided a
computing platform which can be utilized to identify non-coding sequences, such as, for
example, inter-contig region sequences of an organism and to generate primer sequences for

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amplifying such sequences, thus enabling the rapid and efficient cloning of such sequences from an organism." *see* parag. [0075].

Karchi therefore teaches that: "Preferably, the data pertaining to inter-contig sequences of the organism is generated by clustering transcribed nucleic acid sequences of an organism to thereby *generate* contigs" *see* parag. [0075], emphasis added.

Thus, *Karchi* teaches the *generation* of contigs to locate and understand inter-contig regions and non-transcribed DNA regulatory sequences. In contrast, Applicants claims are directed toward understanding the relationships between the contigs and/or ESTs themselves.

Thus, there is no motivation to combine the reference teachings because there is not a reasonable expectation of success.

(2) The combination of references fails to teach all of the claimed elements

According to MPEP 2143.03, to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.

As discussed above, *Imachi* discloses methods for analyzing the content of documents for words. The *Imachi* reference is *completely silent* with respect to disclosure of "a *multi*-dimensional display comprising a *circular* figure having loci distributed about the periphery thereof", as recited in claim 9. Furthermore, as admitted by the Examiner, the *Imachi* reference is silent with respect to disclosure of "contigs" and "EST data".

The *Karchi* reference discloses methods, platforms and kits for identifying and isolating *non-coding* genomic sequences which regulate gene expression in an organism. Thus, Karchi discloses methods of isolating and utilizing *non-transcribed* genomic sequences for generating genotypic and possibly phenotypic variation in the organism and for identifying and characterizing *regulatory sequences* participating in biological pathways. As is well known in the art an EST represents a fragment a transcript that *is transcribed* from genomic sequences.

Thus, the combination of references fails to recite all of the claimed elements.

Conclusion

In summary, one of skill in the art would not be motivated to combine the references because there is not a reasonable expectation of success. Moreover, the combination

of references fails to recite all of the claimed elements. Thus, a proper *prima facie* case of

obviousness has not been set forth. Therefore, the rejection is improper and should be

withdrawn.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this

Application are in condition for allowance. The issuance of a formal Notice of Allowance at an

early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of

this application, please telephone the undersigned at 510-559-6066.

Respectfully submitted,

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